

1 14. (amended) A method of characterizing the condition of a region of interest of skin, wherein  
2 the absorption and scattering of light in different spectral bands by the region of interest is  
3 a function of the condition of the skin, the method comprising:  
4 illuminating a portion of the skin including the region of interest by light in at least three spectral  
5 bands;  
6 digitally imaging the portion of the skin including the region of interest at the at least three  
7 spectral bands with the light re-emitted by the portion of the skin to generate digital  
8 images comprising digital signals whose values are a function of the condition of the  
9 region of interest of the skin; and  
10 providing the digital images to a processor, wherein the processor:  
11 segments the digital images by generating a segmentation mask defining the boundary of  
12 the region of interest from a digital image in any one of the at least three spectral  
13 bands;  
14 computes at least one estimated value for each digital image at each spectral band which  
15 is a function of a characteristic of the region of interest determined by the  
16 segmentation mask;  
17 characterizes the condition of the region of interest of the skin based on the estimated  
18 values, wherein the characterizing step comprises comparing a weighted  
19 combination of estimated values against a threshold value; and wherein the  
20 condition of the region of interest to be characterized is the presence of a  
21 melanoma, and weight coefficients for each parameter value and the threshold  
22 value are selected to maximize specificity, under the constraint of 100%  
23 sensitivity to melanoma, on a representative set of training images; and  
24 outputs the characterization of the condition of the region of interest of the skin.

25 Add the following new claims

1 68. (New claim) A method of characterizing the condition of a region of interest of skin, wherein

1 the absorption and scattering of light in different spectral bands by the region of interest is  
2 a function of the condition of the skin, the method comprising:  
3 illuminating a portion of the skin including the region of interest by light in at least three spectral  
4 bands;  
5 digitally imaging the portion of the skin including the region of interest at the at least three  
6 spectral bands with the light re-emitted by the portion of the skin to generate digital  
7 images comprising digital signals whose values are a function of the condition of the  
8 region of interest of the skin; and  
9 providing the digital images to a processor, wherein the processor:  
10 segments the digital images by generating a segmentation mask defining the boundary of  
11 the region of interest from a digital image in any one of the at least three spectral  
12 bands;  
13 computes at least one estimated value which is a statistical measure of the deviation of  
14 the boundary of the region of interest from the boundary of an ellipse of the same  
15 area, aspect ratio, and orientation as the segmentation mask;  
16 characterizes the condition of the region of interest of the skin based on the estimated  
17 values; and  
18 outputs the characterization of the condition of the region of interest of the skin.

1 69. (New claim) A method of characterizing the condition of a region of interest of skin, wherein  
2 the absorption and scattering of light in different spectral bands by the region of interest is  
3 a function of the condition of the skin, the method comprising:  
4 illuminating a portion of the skin including the region of interest by light in at least three spectral  
5 bands;  
6 digitally imaging the portion of the skin including the region of interest at the at least three  
7 spectral bands with the light re-emitted by the portion of the skin to generate digital  
8 images comprising digital signals whose values are a function of the condition of the  
9 region of interest of the skin; and  
10 providing the digital images to a processor, wherein the processor:

1 segments the digital images by generating a segmentation mask defining the boundary of  
2 the region of interest from a digital image in any one of the at least three spectral  
3 bands;  
4 computes at least one estimated value of a statistical measure of the gradient values of the  
5 intensity of the digital images across the border of the segmented images;  
6 characterizes the condition of the region of interest of the skin based on the estimated  
7 values; and  
8 outputs the characterization of the condition of the region of interest of the skin.

1 70. (New claim) A method of characterizing the condition of a region of interest of skin,  
2 wherein the absorption and scattering of light in different spectral bands by the region of  
3 interest is a function of the condition of the skin, the method comprising:  
4 illuminating a portion of the skin including the region of interest by light in at least three spectral  
5 bands;  
6 digitally imaging the portion of the skin including the region of interest at the at least three  
7 spectral bands with the light re-emitted by the portion of the skin to generate digital  
8 images comprising digital signals whose values are a function of the condition of the  
9 region of interest of the skin; and  
10 providing the digital images to a processor, wherein the processor:  
11 segments the digital images by generating a segmentation mask defining the boundary of  
12 the region of interest from a digital image in any one of the at least three spectral  
13 bands;  
14 computes at least one estimated value based on the ratio of standard deviation of the areas  
15 of dermal papillae to their mean within the segmentation mask;  
16 characterizes the condition of the region of interest of the skin based on the estimated  
17 values; and  
18 outputs the characterization of the condition of the region of interest of the skin.

1 71. (New claim) A method of characterizing the condition of a region of interest of skin,

1 wherein the absorption and scattering of light in different spectral bands by the region of  
2 interest is a function of the condition of the skin, the method comprising:  
3 illuminating a portion of the skin including the region of interest by light in at least three spectral  
4 bands;  
5 digitally imaging the portion of the skin including the region of interest at the at least three  
6 spectral bands with the light re-emitted by the portion of the skin to generate digital  
7 images comprising digital signals whose values are a function of the condition of the  
8 region of interest of the skin; and  
9 providing the digital images to a processor, wherein the processor:  
10 segments the digital images by generating a segmentation mask defining the boundary of  
11 the region of interest from a digital image in any one of the at least three spectral  
12 bands;  
13 computes at least one estimated value of the average and standard deviation of the  
14 thickness of rete ridges within the segmentation mask. for a digital image of the  
15 region of interest determined by the segmentation mask;  
16 characterizes the condition of the region of interest of the skin based on the estimated  
17 values; and  
18 outputs the characterization of the condition of the region of interest of the skin. for a  
19 digital image of the region of interest determined by the segmentation mask;

1 72. (New claim) A method of characterizing the condition of a region of interest of skin,  
2 wherein the absorption and scattering of light in different spectral bands by the region of  
3 interest is a function of the condition of the skin, the method comprising:  
4 illuminating a portion of the skin including the region of interest by light in at least three spectral  
5 bands;  
6 digitally imaging the portion of the skin including the region of interest at the at least three  
7 spectral bands with the light re-emitted by the portion of the skin to generate digital  
8 images comprising digital signals whose values are a function of the condition of the  
9 region of interest of the skin;

1 calibrating each pixel location in the digital image in each spectral band with respect to stored  
2 images of a white target material having known diffuse reflectance, each of the stored  
3 images being an average of a plurality of images acquired at each spectral band, while the  
4 material undergoes continual in-plane motion; and  
5 providing the digital images to a processor, wherein the processor:  
6 segments the digital images by generating a segmentation mask defining the boundary of  
7 the region of interest from a digital image in any one of the at least three spectral  
8 bands;  
9 computes at least one estimated value for each digital image at each spectral band which  
10 is a function of a characteristic of the region of interest determined by the  
11 segmentation mask;  
12 characterizes the condition of the region of interest of the skin based on the estimated  
13 values; and  
14 outputs the characterization of the condition of the region of interest of the skin.